WASHINGTON
SCIENCE TRENDS

HIGHLIGHTS

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* POLICIES, POLICIES -- And More Policies

A rash of policy statements directly relating to Federally-sponsored research, development and technical procurement were issued in Washington during the current week. Because of their significance, they are quoted more or less in their entirety.

Briefly, the new policies:

✓ Set guidelines intended to increase competition in the data processing industry.

✓ Define the roles of the Air Force's controversial nonprofit "think" groups.

✓ Establish Kennedy Administration policy on so-called "in-house" Government R&D.

✓ Encourage scientific journals to bill the Government for printing research results.

The following reports spell out these new policies in more useful detail:

* GOVERNMENT SEEKS "FREE COMPETITION" IN ADP EQUIPMENT

Budget Director David E. Bell this week issued long-awaited instructions to Government Agencies to provide "equal opportunity and appropriate consideration" to all manufacturers of automatic data processing equipment "which meets system specifications."

Bell declared that "the selection of equipment is not to be made until system specifications are available, and the system specifications are to be designed to insure free competition among manufacturers. Capability to fulfill system specifications and overall costs are prime factors to be considered. When equipment of two or more manufacturers meets the system specifications, the equipment which represents the least overall cost to the Government is to be selected."

Bell said it is anticipated that the purchase policies will increase equipment acquisition costs in the short run, but save much larger sums in the long run.

Here are the general guidelines as to whether ADP equipment is to be leased, purchased, or leased with an option to purchase:

✓ Purchase method is to be used when the system study, which preceded the selection of the equipment, has established a reasonable expectancy that the equipment under consideration can be successfully and advantageously used; when a comparative cost analysis of alternative methods of acquisition indicates that a cost advantage can be obtained by the purchase method in six years or less after the date of delivery; and when the capabilities of the ADP equipment will continue to be needed and will be sufficient to satisfy the current and projected system requirements for a period beyond the time at which the purchase method begins to provide cost advantage.

(Continued)

✓ Lease-with-option-to-purchase method is indicated when it is necessary or advantageous to acquire equipment that meets system specifications, but it is desirable to defer temporarily a decision on purchase because circumstances do not fully satisfy the conditions which would indicate purchase. This situation might arise when a short period of operational experience is desirable to prove the validity of a system design on which there is no previous experience, or where decisions which might substantially alter the system specifications are imminent.

✓ Lease method, without option to purchase, is indicated only when it is necessary or advantageous to acquire equipment that meets system specifications and it has been established conclusively that any one of the conditions under which purchase is indicated is not attainable.

The instructions also re-emphasize the need for analytical studies as a precedent to decisions on the selection and acquisition of ADP equipment, as well as "readiness reviews" prior to acceptance, and require "adequate documentation" of studies, reviews and decisions.

* "IN-HOUSE" LABORATORIES

Defense Secretary Robert S. McNamara states his "profound concern for the maintenance of a vigorous program and the highest morale" in Defense Department Laboratories. He delcares:

"The work which they have accomplished in the past and which they are doing now is of great importance. The technical standards for the laboratories must be raised and maintained at the highest level. The Department of Defense must ensure that these laboratories, which constitute one of our greatest assets, are properly supported and utilized."

McNamara's program for "strengthening in-house laboratories" will follow these guidelines:

✓ Primary Means -- "The in-house laboratories shall be used as a primary means of carrying out Defense Department programs. They shall provide scientific and technical advice in the exercise of Government responsibility for development and acquisition of new weapons.

✓ Less Rotation -- "Clear lines of technical management and responsibility shall be established for each in-house laboratory. To this end, the policies and the practices on rotation of duty for officer-scientists will be such as to permit extended tours of duty in positions for which they have demonstrated technical proficiency. In addition, procedures will be established by which the principal laboratories of each Service will be brought under the more effective control of the Assistant Secretaries for Research and Development of each of the military departments.

✓ Less Prior Approval -- "Depending upon the mission and nature of the work of the particular laboratory, a fraction of the annual laboratory budget shall be set aside for work judged by the laboratory director to be of promise or importance without need of prior approval or review at higher levels. The results of this work shall be reviewed by the Assistant Secretaries for Research and Development of the Military Departments.

✓ Compensation Rates -- "Full and complete advantage shall be taken of the existing Public Law-313 provisions which set compensation rates for senior technical personnel in the Defense laboratories. This specifically includes recognition of outstanding performance by the working scientists and engineers who are not in administrative positions.... The Department will make every effort to secure rates of compensation for its senior personnel which, commensurate with the responsibilities which they exercise and with their professional talents, are consistent with levels set outside as well as inside the Government service."

* AIR FORCE POLICY ON "THINK" GROUPS

The Air Force this week made public a new policy statement on nonprofit corporations with which it is affiliated. These include the Aerospace Corp., Analytical Services Inc., Mitre Corp., Rand Corp. and System Development Corp. The full text follows:

"Close and Continuing Relationship" -- "These Air Force sponsored nonprofit corporations have a close and continuing relationship with the Air Force that sets them apart from other organizations, profit or nonprofit. It is to this special status that our policies on relations with them must be shaped. We look to these nonprofit corporations to focus the nation's finest scientific and technical talents on selected and highly sophisticated tasks. They must not become convenient catchalls for projects which could be performed by private industry; the elite nature of their technical staffs must be preserved. Any dilution of the select quality of these organizations can only have an adverse effect on their ability to carry out their vital Air Force work. Procedures must be developed to require them to coordinate with the Air Force before undertaking assignments from other Government agencies or commercial sources.

"Accountability" --"It follows, moreover, that the business aspects of their affairs must be open to Air Force scrutiny, much as an actual Air Force operation. Frills and other nonessentials cannot be tolerated, if public confidence is to be maintained in their unique role. Such accountability is not inconsistent with the freedom of thought and independence on technical matters that we seek from these corporations.

"Standards of conduct likewise merit particular emphasis. There must be no conflict between the public interests with which these nonprofit corporations are impressed, and the private interests of their trustees, officers, members of technical staffs and other employees. Each corporation will be expected to prescribe and enforce suitable regulations to this end. These should take advantage of the progress that certain companies have already made -- as for example, in the area of trustees. This includes disclosure by a trustee of any private interests which may be in conflict with his responsibilities, his disqualification in particular matters, and restrictions on his use of inside information.

"The special position of certain of these corporations exposes them to extensive technical information of other contractors. To prevent the possibility or appearance of private advantage to these corporations, our contracting officers should proceed in accordance with the recently revised policy in Paragraph 9-107.1 of the Armed Services Procurement Regulation. This policy provides guidance on the acquisition by the Government of title to inventions, in lieu of a comprehensive license of free use, where the services of the contract are largely those of coordinating and directing the work of others.

"Fee a Proper Source of Assistance" --"The fees allowed these corporations must also be tailored to their special status. While the amount of the fee in a particular case is necessarily a matter of judgment it is clear that the traditional rules covering commercial companies do not fit these nonprofit corporations, particularly when the bulk of their contracts are assigned on a sole source basis. We recognize, however, that these organizations have legitimate needs that can be met only through fee. Above all, their stability must be assured, if they are to continue as effective instruments. For this purpose, fee is a proper source of assistance to these corporations, to be applied, for example, toward the conduct of independent research programs. Such programs, which foster a healthy scientific climate, are to be encouraged, provided they are carefully planned and held within reasonable bounds. The fee may also be reserved for some working capital requirements, but should not be regarded as a substitute for advance payment arrangements, the preferable source.

* "THINK" GROUPS (Continued)

"Facility Problems" -- "Facilities, too, warrant different treatment. As a general rule the Government should provide these corporations with the buildings required for the performance of their contracts. There may, however, be circumstances which justify the acquisition of facilities by these corporations with their own resources. Inordinate fees must, of course, not be allowed for this purpose; instead, consideration should be given to private financing under time-phased arrangements guaranteed, if necessary, by the Air Force. In the case of company furnished facilities, the costs of maintenance and repair, but not depreciation, can properly be charged to Air Force contracts. Leasing of facilities by these corporations may, at times, prove to be a sound method of satisfying short-term or emergency working space needs. But these leases must have reasonable rental rates and avoid arrangements which permit the lessor to recover his investment on an accelerated basis.

"As a corollary to the foregoing policies, the charter of at least one firm authorizes the Secretary of the Air Force to direct the disposal of its assets upon dissolution; and a provision to this effect is now under active consideration by the trustees of yet another corporation. The boards of the other nonprofit corporations should be asked to take similar action.

"Salary Problems" --"Salaries pose perhaps the most difficult problem of all. Charged with heavy and varied responsibilities, it is clear that these corporations must attract and retain talent of the highest order. Yet, their employment policies must be marked by good judgment and restraint. These companies have no license to outbid the market at every turn. If the compensation paid by these nonprofit corporations exceeds that paid by the Government, it should be because private industry -- with whom these companies must compete for scientific, technical and other personnel -- typically offers such higher compensation. The Air Force, on its part, must continue to review for reasonableness certain individual salaries as well as the overall compensation structure of these corporations.

"The policies outlined herein are designed to illustrate, not to exhaust, the guides that must be followed in Air Force relations with these nonprofit corporations. So far as possible, these policies should be applied uniformly to all of these corporations, for while they differ from other contractors, these nonprofit corporations have much in common. Standardization should be the rule, down to such particulars as contract clauses; exceptions must be firmly founded in fact."

* SCIENCE FOUNDATION ESTABLISHES RESOURCE PLANNING OFFICE

Dr. Richard H. Bolt is leaving his position as Associate Director (Research) for the National Science Foundation to assume a new post as head of the Foundation's Science Resources Planning Office which "will pull together needed analyses of critical issues and will present the results in forms particularly suitable for use in policy formation and decision making." Dr. Bolt remains on leave from the Massachusetts Institute of Technology and the firm of Bolt, Beranek and Newman.

* SCIENCE FOUNDATION TO ANNOUNCE COLLEGE EQUIPMENT PROGRAM

The National Science Foundation has scheduled for public announcement October 26, 1961, a program for purchase of scientific equipment for undergraduate instruction. Universities wishing to participate must match funds on a 50-50 basis, with a limit of $25,000 per proposal.

* U. S. TO SUBSIDIZE SCIENTIFIC JOURNALS

Federal Council for Science and Technology has now made standard for all Government agencies a policy permitting so-called "page charges" when results of U. S. - sponsored research are printed in journals published by non-profit organizations. Such charges will be budgeted for and paid "as a necessary part of research costs under Federal grants and contracts."

Page charges are usually calculated as a part of the cost of composition and make-up of journals. Journals can receive Federal subsidy payments only if they submit to the following Federal controls:

✓ The research papers in question report work supported by the Government.

✓ The charges are "levied impartially" on all research papers published by the journal, whether by non-Government or by Government authors.

✓ Payment of such charges is "in no sense a condition" for acceptance of manuscripts by the journal.

✓ The journals "are not operated for profit."

National Science Foundation officials who announced the subsidy policies had no information immediately available on estimated costs. Officials also were not prepared to comment on whether or not this new policy would tend to make publication more difficult for individual investigators or scientists from less wealthy companies and institutions.

The National Science Foundation stated that the new policy, and accompanying controls, would aid in the "speed and effectiveness" of disseminating scientific information. Officials were not prepared to comment on the practice of withholding scientific information for many months so that results can appear first in a favored journal.

Note: The National Science Foundation also has currently active programs for subsidizing new journals, expanding old journals, eliminating journal publication "backlogs", as well as subsidizing the education of science writers, trade magazine writers and editors. newspaper executives and publishers, radio and television personnel and selected publicists. The Foundation also has a growing program of publishing its own periodicals and subsidizing television productions, etc.

* NAVY DEVELOPS NITINOL ALLOY

Navy researchers believe they have developed an "important class of new non-magnetic alloys" to be known as "Nitinol" based on the intermetallic compound TiNi. The alloys are expected to have a wide range of defense and commercial applications. Navy spokesman said the alloys may be freely used by private industry.

Nitinol, according to the Navy, is non-magnetic, corrosion resistant and can be hardened to 62 Rockwell "C" -- almost the hardness of tool steel. Officials describe the alloy as strong and tough, having been tested up to 43 foot-pounds impact strength. In contrast to certain other alloys, toughness increases as temperatures decrease -- yet it is suitable for use up to about 1200°F. A specific gravity of 6.45 is said to offer increased strength without adding weight to aircraft, tools or other applications. In addition, a very high mechanical vibration capacity at room temperature, which decreases rapidly as temperature is increased, is said to be advantageous.

The Navy suggests possible applications in space and aircraft components, chemical handling equipment, non-magnetic tools for mine disposal and other ordnance work, stainless cutlery, jewelry, auto trim, non-magnetic watch parts, etc.

(Development by Magnetic Materials Division, U. S. Naval Ordnance Laboratory, White Oak, Silver Spring, Md.)

TECHNICAL TRENDS

□ A new survey indicates that the U. S. aviation industry faces strong European competition in the Near and Middle East, particularly in sales financing. The "World Survey of Civil Aviation, Near and Middle East" is available (at 20 cents) from the U. S. Government Printing Office, Washington 25, D. C. √√√ Research sources in the LOPAIR (Long Path Infrared) detection system are being sought by the Army Chemical Center Procurement Agency, Attn: Mrs. Anne H. Schwartz, R&D, Army Chemical Center, Md. √√√ The Navy's Bureau of Ships expects to purchase a group of ten navigational radars from the Raytheon Co., Waltham, Mass. for use with Landing Craft, Swimmer, Reconnaissance (LCSR). √√√ Panhandle Eastern Pipe Line Company and National Distillers and Chemical Co. will join in construction of large plant near Liberal, Texas to process natural gas for helium. They have an Interior Department contract for helium purchases which may total more than $300 million over the next 22 years.

□ The Rome Air Development Center, Griffis Air Force Base, N. Y. expects to contract for development of an magnethohydrodynamic (MHD) power generator to be used with radio frequency conversion systems for communications and surveillance. √√√ Sperry Gyroscope Co., Great Neck, N. Y. has won a $6.5 million Bureau of Naval Weapons contract for a Passive Underwater Fire Control Feasibility Study (PUFFS) with which a submarine can detect a target, compute range and bearing information and automatically feed this data to a fire control system which directs torpedo launchings. √√√ Information on a November 3, 1961 symposium on Radioisotopes for the Mineral Industries, co-sponsored by the Atomic Energy Commission is available from R. G. Redelfe, St. Joseph's Lead Co., Zinc Smelting Division, Monaca 7, Pennsylvania. √√√ AEC is also assisting in a Boston Area conference November 14-15, with information available from Raymond I. Rigney, Massachusetts Commission on Atomic Energy, 150 Causeway Street, Boston 14, Mass.

□ The Interior Department has signed a $142,900 contract with Bituminous Coal Research, Monroeville, Pa. for study of the preparation, transportation and utilization of pulverized coal. Department officials are now evaluating some 150 other research proposals in coal technology and applications. √√√ President Kennedy has made a special point of commenting upon the materials research centers now being established at certain leading universities. University of North Carolina, University of Maryland and Purdue University received the most recent grants -- which include a novel four-year support commitment "so that full values of the continuing nature or research and education can be properly combined." √√√ The Office of Technical Information, National Bureau of Standards, has available a brief report on studies to determine the reaction mechanisms of various types of electrochemical processes. Ask for "Relaxation Theory Applied to Electrode Reactions."

□ Information Office, Bureau of Reclamation, U. S. Department of the Interior, Washington 25, D. C. has available Announcement P.N. 101418-61, outlining requirements for fabrication of a variety of experimental transmission line towers to be built in the Southwest. The Department is particularly interested in new types of towers that can be transported and maintained by helicopter. √√√ The Kennedy Administration determined that a manned lunar landing was feasible in this decade after analyzing some 2,200 discrete tasks with respects to schedules and costs and running the information through computers using the PERT performance evaluation and review technique. √√√ Information on surplus quantities of rhodium sponge and powder, used in electroplating and for electrodes, resistors and as a catalyst, is available from the Project Administration Division, Room 6030, GSA Building, Washington 25, D. C. √√√ The Army expects to save $3.8 million by substituting aluminum alloy for titanium in Pershing missile splice rings. Use by Eclipse Pioneer Division of the Bendix Corp. of a Steinel multi-boring machine is expected to save one-third in production of stable platforms for the missiles guidance and control system. Use of a crimp-type socket and connector is expected to replace soldering connectors on certain Pershing relay boxes, at a saving of $140,000 and with increased reliability.

RESEARCH CHECKLIST

□ MECHANICAL PROPERTIES OF FOILS: The National Bureau of Standards has developed a simplified method for determining the mechanical properties of stainless steel foil. Specimens of foil were being used to facilitate rapid temperature changes during heat treatment studies. The Bureau researchers found that hydraulic bulge tests using commercially available equipment can provide satisfactory data. Advantages of this technique are said to include the ease of specimen preparation, the small amount of material required, and the freedom from edge effects.

(For further information on a "Method for Determining the Mechanical Properties of Metal Foils" write National Bureau of Standards, Office of Technical Information, Washington 25, D. C.)

□ PROTECTIVE COATING FOR YTTRIUM: A new technique for applying a glassy, impervious coating of glass to yttrium has been developed in work for the Atomic Energy Commission. The glass is said to have the capability of dissolving the detrimental oxide films which are normally formed at the interface during or prior to the firing operation. The most satisfactory coating was found to be a glass containing an appreciable amount of cerium oxide -- giving good protection to yttrium in air to about 900° C.

(Development reported by D. R. Wilder, Ames Laboratory, Iowa State University of Science and Technology, Ames, Iowa)

□ NEW PHOTOELECTRIC PYROMETER: The National Bureau of Standards has developed a pyrometer which uses a photoelectric system to attain considerably higher precision than an optical pyrometer previously used. Potential applications include calibration of conventional optical pyrometers and tungsten strip lamps, and redetermination of the platinum point.

(For further details on "Photoelectric Pyrometer" write National Bureau of Standards, Office of Technical Information, Washington 25, D. C.)

□ "PRIVATE EYE" FOR CHEMICAL WARFARE: The General Electric Co., Ithaca, N. Y. has developed a device termed "Private Eye" -- a small aperture filter-wheel LOPAIR (Long Path Infrared) system for chemical warfare detection purposes. Preliminary laboratory tests have indicated that an optical system of only 2.5 inch aperture is adequate to provide specified sensitivity. GE investigators believe that a system could be built which would weigh from 10 to 15 lb. including batteries. The system is contained in two packages: a sensor head which contains the optics, filter wheel, detector and preamplifier and the computer package which contains the remainder of the electronics, an alarm, and the power supply.

GE estimates that a "universal" type of instrument could be designed. For example, the device could be equipped with a transmitter, fins, a pointed stake with poly-foam impact absorber, and be air dropped into the suspected areas. By removing these components, the Army has been advised, the system could be small enough to be hand held by foot soldiers. An auxiliary IR source could convert the present passive system to an active system that could be used at airbases and other strategic locations.

(For further details see Report AD 256 940 available through military channels or at $2.60 from OTS, U. S. Department of Commerce, Washington 25, D. C.)

PUBLICATION CHECKLIST

- ☐ COMMUNICATION SATELLITES, a massive compilation of statements, testimony and exhibits from government and industry on the technical, legal and political aspects of satellite communication systems, past, present and future. 908 Pages. Single Copies Free. (Write Committee on Science and Astronautics, New House Office Building, Washington 25, D. C. for Hearings, Communications Satellites, Parts I and II)

- ☐ SCIENCE, COMMUNIST CHINA, a guide describing the scientific organizations and publications of the Chinese Communists. 104 Pages. 55 cents. (Write Superintendent of Documents, Government Printing Office, Washington 25, D. C. for Mainland China Organizations of Higher Learning in Science and Technology)

- ☐ NUCLEAR ENERGY INDUSTRY, UNITED KINGDOM, a well-illustrated survey of plant, equipment, materials and services in the field of nuclear energy which is available to overseas buyers. 71 Pages. $1.35. (Write British Information Services, 45 Rockefeller Plaza, New York 20, N. Y. for Nuclear Energy Industry of the United Kingdom)

- ☐ TUNGSTEN TECHNOLOGY, a review of major developments in the technology of tungsten for the period May through August, 1961. 6 Pages. Single Copies Free to Government agencies, their contractors, subcontractors and suppliers. (Write Defense Metals Information Center, Battelle Memorial Institute, Columbus 1, Ohio for DMIC Memorandum No. 127)

- ☐ PROJECT ECHO ANTENNA STEERING SYSTEM, a technical paper describing a new type of special purpose data converter for directing narrow-beam communication antennas on the basis of predicted information. Prepared by Bell Laboratories. 17 Pages. Single Copies Free. (Write National Aeronautics and Space Administration, ATTN: Code BID, Washington 25, D. C. for NASA Technical Note D-1137)

- ☐ HIGH ENERGY PHYSICS-USSR, a detailed trip report on a May, 1959 visit to Soviet High Energy physics institutions, including information on equipment and plans as of that time. 58 Pages. (Publication TID-6597 (Rev.) available through AEC Channels or at $1.50 from OTS, U. S. Department of Commerce, Washington 25, D. C.)

- ☐ ZIRCONIUM STUDIES, a technical report on studies which indicate that hafnium and zirconium compounds of "acceptable purity" can be extracted from Nigerian zircon concentrates. 28 Pages. Single Copies Free. (Write U. S. Bureau of Mines, 4800 Forbes Avenue, Pittsburgh 13, Pa., ATTN: Publication Distribution, for Report of Investigation No. 5747)

- ☐ INDUSTRIAL RESEARCH AND DEVELOPMENT, a highly detailed study which supports the conclusion that as of 1958, funds for R&D performance in the industry sector of the economy totaled $8.2 billion. 119 Pages. 65 Cents. (Write Superintendent of Documents, Government Printing Office, Washington 25, D. C. for Publication NSF 61-32)

- ☐ PACKAGING GUIDED MISSILE ELECTRONICS, an Army study which points up the heavy development costs involved in providing satisfactory packaging for guided missile electronics -- one fuze took five years to develop at a cost of more than $3 million. A method for reducing this time and expense is proposed which makes use of specific mounting materials and cooling fluids. 67 Pages. (Report AD 255 658 available through military channels or at $6.60 in photocopy form from OTS, U. S. Department of Commerce, Washington 25, D. C.)